034
TAG Modification
5/27/22

STATE OF WASHINGTON

STATE BUILDING CODE COUNCIL

Washington State Energy Code Development

Standard Energy Code Proposal Form

Code being amended: ☐ Commercial Provisions **X** Residential Provisions

Code Section #: Table 406.3 - Energy credit options 3.1 and 3.2

Brief Description:

Provide an optional 0.5 energy credit for High Efficiency HVAC Equipment Options as 3.7, applying to 3.1 and 3.2 for the use of a connected thermostat on ENERGY STAR Certified Smart Thermostats | EPA ENERGY STAR. Savings apply to central ducted forced air heat pumps, gas furnaces (NG and LP) and central hydronic boiler systems.

Note: This could also be included in Definitions.

CONNECTED THERMOSTAT. An internet enabled device that automatically adjusts heating and cooling temperature settings.

Proposed code change text: (Copy the existing text from the Integrated Draft, linked above, and then use underline for new text and ~~strikeout~~ for text to be deleted.)

OPTION	DESCRIPTION	CREDIT(S)	
		All Other	Group R-2
3. HIGH EFFICIENCY HVAC EQUIPMENT OPTIONS Only one option from Items 3.1 through 3.6 may be selected in this category.			
3.1[a]	Energy Star rated (U.S. North) Gas or propane furnace with minimum AFUE of 95% **or** Energy Star rated (U.S. North) Gas or propane boiler with minimum AFUE of 90%. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.	1.0	1.0
3.2[a]	Air-source centrally ducted heat pump with minimum HSPF of 9.5. To qualify to claim this credit, the building permit drawings shall specify the option being selected and shall specify the heating equipment type and the minimum equipment efficiency.	1.0	N/A
[illegible]	[illegible]	[illegible]	[illegible]

3.7[b] Connected thermostat meeting ENERGY STAR Certified Smart Thermostats | EPA ENERGY STAR specifications 0.5 0.5

Footnote b: Option 3.7 can only be taken with Options 3.1 and 3.2.

Note: Need to add the word "and" to all energy credits that offer an "or" option to include the verbiage afterwards such as "to qualify to claim this credit,…"

Purpose of code change:

This proposal:

- Provides additional options for saving energy that are cost effective (4-year simple payback, per communications with EPA)
- Provides builder and occupant flexibility to meet energy credits
- Improves HVAC contractor compliance with R403.1 Controls per R403.1.1.1 and 403.1.2
- Reduces AHJ workload associated with R403.1.1.and R403.1.2

This proposal also provides additional benefits to occupant, utility, and climate goals related to:

- Utility demand response
- HVAC fault detection
- Occupant and/or service technician maintenance and operation
- IoT platform for saving additional energy from:
    - Miscellaneous electric loads, GFIs, garage doors, smart plugs, etc.
    - Lighting
    - Appliances
    - Smart ventilation
    - Shutting off equipment besides HVAC when not needed (daily, weekly, or vacation modes)

Your amendment must meet one of the following criteria. Select at least one:

☐ Addresses a critical life/safety need.

☐ The amendment clarifies the intent or application of the code.

X Addresses a specific state policy or statute.
(Note that energy conservation is a state policy)

☐ Consistency with state or federal regulations.

☐ Addresses a unique character of the state.

☐ Corrects errors and omissions.

Check the building types that would be impacted by your code change:

X Single family/duplex/townhome

☐ Multi-family 1 – 3 stories

☐ Multi-family 4 + stories

☐ Commercial / Retail

☐ Institutional

☐ Industrial

Your name Michael Lubliner

Your organization WSU Energy Program

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Instructions: Send this form as an email attachment, along with any other documentation available, to: sbcc@des.wa.gov. For further information, call the State Building Code Council at 360-407-9278.

Economic Impact Data Sheet

Is there an economic impact: X Yes ☐ No

Briefly summarize your proposal's primary economic impacts and benefits to building owners, tenants, and businesses. If you answered "No" above, explain your reasoning.

Simple payback is less than 4 to 8 years over a 15-year useful life.

EPA connected thermostats cost about $200 (after 35% markup from contractor to owner) per communication with EPA).

Intended to provide 0.5 energy credit for gas 95% furnace or HSPF 9.5 ASHP with improved strip backup heating that provides 600 kWh/year. Consumer annual savings are expected to be roughly 10 cents/kW = $30-$60/year saved. The cost of the connected thermostat can be reduced if one considers the manual setback thermostat has comparable costs. ETO and other studies suggest manual setback thermostats result in less energy savings then using connected thermostats for daily, weekend, and vacation settings. Additional heat pump savings from connected thermostats are realized from improved supplemental electric resistance heat lockout controls above 35°F. Research suggests that the AHJ field verification does not include the scope of verifying the control settings. In addition, many HVAC contractors do not adjust from non-lockout electric resistance mode to lockout controls above 35°F mode. The lockout control algorithms in many EPA connected thermostats will result in more realized savings for single-speed heat pumps with 10-15kW of strip heat

Documentation of savings:

- Numerous national utility research studies
- Franklin PUD/BPA
- NEEA
- ETO
- Other – EPA Protocol

Sources:

- https://www.energystar.gov/products/spec/connected_thermostats_specification_v1_0_pd
- ENERGY STAR Certified Smart Thermostats | EPA ENERGY STAR
- https://www.aceee.org/files/proceedings/2016/data/papers/2_490.pdf

Provide your best estimate of the construction cost (or cost savings) of your code change proposal? (See OFM Life Cycle Cost **Analysis tool** and **Instructions;** use these **Inputs**. **Webinars on the tool can be found Here and Here**)

$Click here to enter text./square foot (For residential projects, also provide $Click here to enter text./ dwelling unit)

Show calculations here, and list sources for costs/savings, or attach backup data pages. Provide your best estimate of the annual energy savings (or additional energy use) for your code change proposal? Click here to enter text.KWH/ square foot (or) Click here to enter text.KBTU/ square foot (For residential projects, also provide Click here to enter text.KWH/KBTU / dwelling unit). Show calculations here, and list sources for energy savings estimates, or attach backup data pages

List any code enforcement time for additional plan review or inspections that your proposal will require, in hours per permit application:

No impact for AHJs, who typically do not have time to verify. The use of the EPA connected thermostats in this proposal (for heat pumps) would reduce the time needed to verify the electric resistance supplemental lockout specified in R403.1.2.

All questions must be answered to be considered complete. Incomplete proposals will not be accepted.

AHJs do not often look at thermostat control at final. A small percentage of these may not get programmed and connected to the IoT. However, it is believed that the percentage of thermostats that are not set up is much lower than for manual set-back thermostats as required in 403.1.1 (see sources listed above)

All questions must be answered to be considered complete. Incomplete proposals will not be accepted.